Work Plan Addendum 3

Corrective Action

Indoor Air Quality Assessment

Submitted to

Modine Manufacturing Company

December 2002

CH2MHILL

CH2MHILL TRANSMITTAL

To: Missouri Department of Natural Resources
7545 S. Lindbergh Blvd., Suite 210
St. Louis, MO 63125

From: Dan Price

Attn: Chris Kump

Date: December 23, 2002

Re: Modine Manufacturing Company - Camdenton

We Are Sending You:

☑	Attached	Under separate cover via	
	Shop Drawings	Documents	Tracings
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2	Corrective Action Indoor Air Quality Assessment - Work Plan Addendum 3

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Remarks: The attached Tables and Figures are Draft and therefore subject to change prior to incorporation into the Final Technical Memorandum summarizing the results of this work.

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Modine Manufacturing Company
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SECTION 1

1.0 Introduction

The purpose of this Work Plan Addendum 3 (Addendum) is to summarize the actions proposed by Modine Manufacturing Company (Modine) to assess indoor air quality at the Modine facility located at their 179 Sunset Drive facility in Camdenton, Missouri (EPA ID: MOD062439351). This Addendum is a continuation of the Corrective Action excavation activities conducted pursuant to the Missouri Department of Natural Resources (MDNR) Corrective Action Abatement Order on Consent issued in July 1999 and the Corrective Action Work Plan approved by MDNR in September 2001 and previous Addendums.

1.1 Background and History

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- In October and November 2001, excavation was performed of soil impacted with chlorinated VOCs in excess of MDNR Cleanup Levels for Missouri (CALM) Soil Target Concentrations (STARC) Leaching to Groundwater (C_{LEACH}) levels. Approximately 4,800 cubic yards of soil was excavated, segregated, and stockpiled, of that, 3,000 cubic yards exceeded the levels.
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unacceptable human exposures to contamination and thus satisfy the Environmental Indicator "Current Human Exposures Under Control" used by EPA to track progress at sites under the RCRA Corrective Action Program.

Originally indoor air quality modeling (Johnson and Ettinger model - USEPA, 2000) was proposed to estimate indoor air concentrations of VOCs infiltrating into the Modine facility and potential risks from the indoor air inhalation route of exposure. However, Modine decided that actual sampling of the indoor air would provide definitive numbers related to human exposure from this pathway.

This decision was further supported by an October 2, 2002, letter from MDNR stating that MDNR had completed corrective action Environmental Indicator (EI) evaluations for Modine. The evaluations indicated that more information was needed to determine if human exposure to contamination was occurring at the Modine facility in the form of indoor and outdoor air quality.

SECTION 2

2.0 Project Approach

This section discusses the tasks that will be performed for the Air Quality Assessment at Modine.

2.1 Indoor Air Quality Assessment

Chemicals of concern (COCs) for the air quality assessment are trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE) and vinyl chloride. These chemicals were identified as the COCs for air sampling as they were the chemicals identified in site soils that drove the corrective action.

The indoor air point-concentrations measured during the air quality assessment will be compared with risk-based screening levels based on a worker exposure scenario. The target indoor air concentrations are listed in Table 1. These values are based on the US EPA standard default worker exposure assumptions, with values for the carcinogenic chemicals based on a 1×10^{-5} risk level and non-carcinogenic chemicals based on a hazard quotient of 1. If the measured indoor air concentration for a COC is below the screening level, then the exposure pathway for the COC is considered broken and it will not be further evaluated. Should indoor air concentrations higher than the screening levels be detected, Modine will identify actions to evaluate these results further.

Table 1: Target Indoor Air Concentrations

Chemical of Concern	*Target Indoor Air Concentration (ug/m^3)*
Cis-1,2-dichloroethene	51
Trichloroethene	7.2
Vinyl chloride	9.3

2.1.1 Pre-Sampling Activities

A pre-sampling assessment of the facility was conducted to define the most appropriate sampling locations. The assessment consisted of a review of facility plans and an interview with Modine plant management to delineate areas of interest for air sampling within the Modine plant. The assessment identified: areas of the plant on separate heating, ventilation, and air conditioning (HVAC) systems, plant construction and renovation details, equipment locations and current usage of plant areas.

The EPA recommends that in cases of a soil-gas source of contamination, a temperature differential of at least 10 degrees will facilitate underpressurization, causing soil-gas to be drawn into the building structure (Massachusetts DEP, April 2002). Therefore, indoor air monitoring at the Modine plant is proposed for the winter or early spring months when the ambient air temperature outside is lower than the indoor air temperature. Sampling under

these 'worst case conditions' will ensure that only one sampling event is necessary to show compliance with the environmental indicators. However, it should be noted that these factors are less important in a building of such significant size as the Modine plant.

2.1.2 Indoor Air Sample Locations

Indoor air sample locations within the Modine plant have been selected based on information relating to the building construction, ventilation system and the historical use of the plant. Areas of the plant were selected as sampling locations based on the following:

- Floor breaches - samples will be collected where a higher potential exists for air transfer between the soil beneath the building and the indoor air.
- HVAC system service areas - A sample will be collected within each of the three plant areas served by a separate HVAC system (office area, plant floor, and chemical storage area/training room/laboratory).
- Prior use - samples will be collected where past activities may have caused subsurface contamination.

A total of six sampling locations were identified. Figure 2 depicts the indoor air sampling locations.

Two air canister samples will be collected from locations in the Modine facility office area on the north end of the plant due to the high density of people working within the area throughout the workday. Air sample MD-AS-01 is located in a conference room on the east side of the office area. Air sample MD-AS-02 is located within a bathroom of the office wing. The bathroom location has a potential for air transfer between the building and the subsurface due the presence of sewer drains that transect the concrete floor.

Three air canister samples will be collected from locations on the Modine facility plant floor within the same HVAC system. Air sample MD-AS-03 is situated in the northeast corner of the plant close to the oven room and a six-foot deep concrete lined pit that drains to the pre-treatment waste line. Air sample MD-AS-05 will be located west of the welding cells, near the drainage trench in the center of the plant. This will also be the location for the field duplicate sample. As the welding cells each have self-contained exhaust ventilation systems, the canisters will be placed outside of the impact zone of this ventilation. Air sample MD-AS-06 will be located on the southern end of the plant within the historical area of the monorail degreaser. The former monorail degreaser was once a below surface grade production operation using volatile organic chemicals. It should be noted, this area was renovated and is now covered with grade-level concrete flooring.

The chemical storage area, training room and laboratory have a separate HVAC system. Thus, the canister for air sample MD-AS-04 will be located within the training room in this area.

Care will be taken to locate canisters outside traffic areas and to clearly mark sample locations with traffic cones to prevent accidental damage. Modine plant management will inform employees of the importance of leaving canisters untouched during the sampling event.

2.1.3 Sampling Procedures

Indoor air samples will be collected using canister integrated sampling. Use of canisters will ensure a sample can be collected over the time period necessary, and will enable subsequent laboratory analysis of the specific COCs at the desired detection limits. This method will involve placing a vacuum evacuated stainless steel canister (referred to as a SUMMA canister) in each of the sample locations (see Section 2.1.2). Each canister will be connected to a flow controller and set to continuously draw an air sample over a twenty-four hour period. (See appendix 1, Standard Operating Procedure for Canister Integrated Sampling.)

A total of six canister samples, one field duplicate sample and one blank sample will be collected. All canisters will be supplied from and returned to the CH2M HILL Analytical Services Laboratory for analysis.

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Air samples will be analyzed by the CH2M HILL Applied Science Group laboratory in Corvallis, Oregon via USEPA method TO-14 for the volatile organic compounds TCE, cis-1,2-DCE and vinyl chloride. Normal turn around time for the analysis is fourteen days.

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The results of the Indoor Air Quality Assessment will be presented in a report summarizing the sampling event and analytical results. The report will follow the same "Technical Memorandum" format as previous submittals and will consist of a discussion of the sampling, laboratory analytical results and our conclusions. Field documentation, photographs, summary tables of laboratory results and laboratory analytical data sheets will be included as attachments or appendices.

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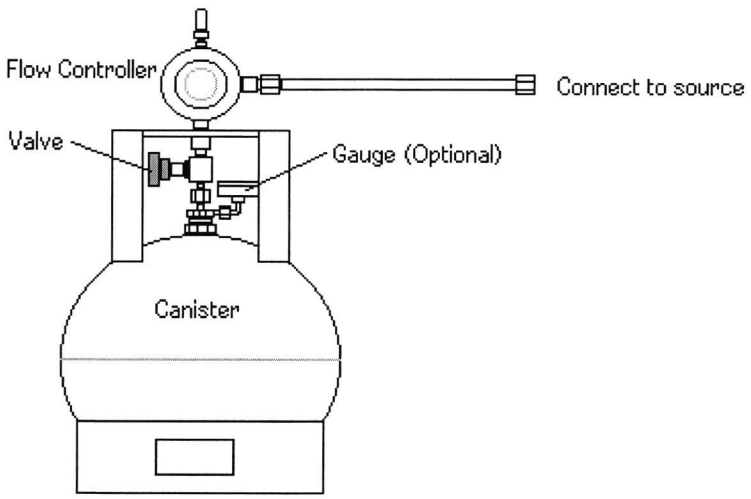
Canister Integrated Sampling

This procedure is for collecting volatile organic compounds in air. You will need a sample line, flow controller and a stainless steel canister which has been cleaned, certified and evacuated (to 29" Hg).

1. Verify that the flow controller is set correctly to achieve the desired sampling rate. See the appropriate SOP for instructions.
2. Remove the cap from the valve on the canister.
3. Connect the flow controller to the canister. The connection on the flow controller denoted with a 'LP' or 'OUT' should be attached to the canister.
4. Connect the sample line between the source and the port labeled 'HP' or 'IN' on the flow controller.
5. To begin sampling, slowly open the canister valve.
6. Monitor the pressure increase several times during sampling to ensure that the canister is being filled.
7. Close the valve finger tight, remove the flow controller, and replace the cap.
8. If using a flow controller for more than one sample, be sure to purge it before each sample event. To do this, attach the flow controller to the next source and let sample flow through it for several minutes before attaching it to the canister.
9. Fill out all appropriate documentation (chain of custody, sample tags) and return canisters and all equipment to the address below.
10. When packing the canisters for shipment, verify that the valve caps are snug (1/4 turn past finger tight), and use sufficient packing to prevent the valves from rubbing against any hard surfaces.

Please do not place sticky labels or tape on any surface of the canister



Return to:
CH2M HILL
Applied Sciences Laboratory—Sample Receiving
2300 NW Walnut Boulevard
Corvallis, OR 97330-3538

If you have any questions, please call Customer Services at (541) 758-0235, ext. 3120.

FIGURES

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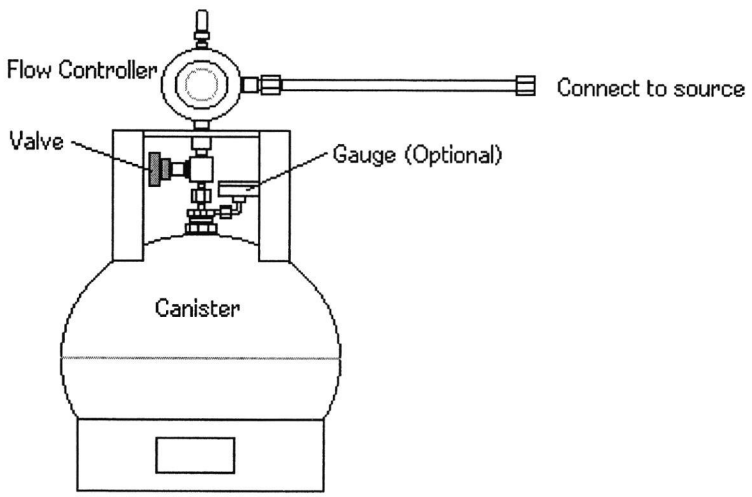

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FIGURES

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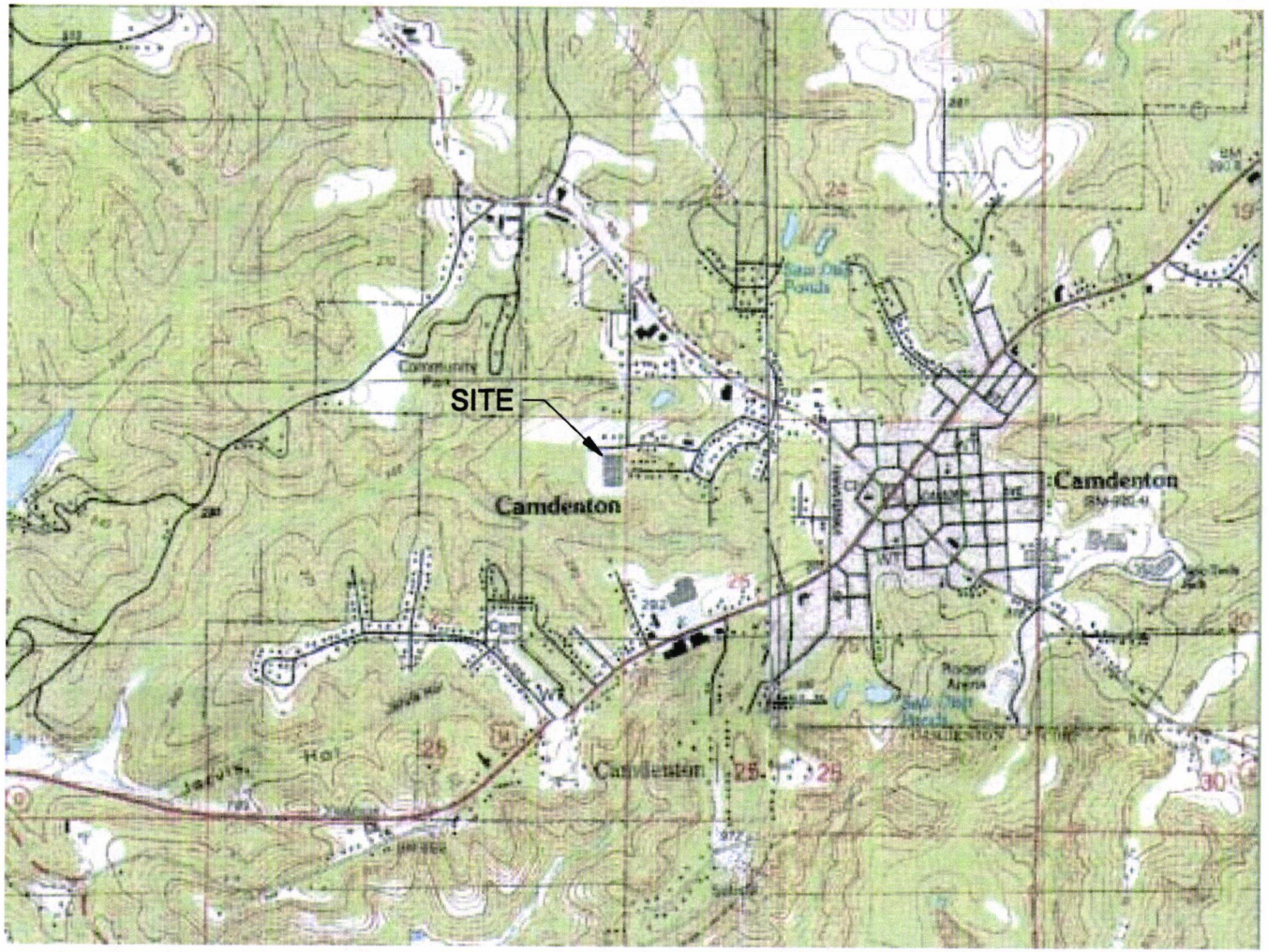
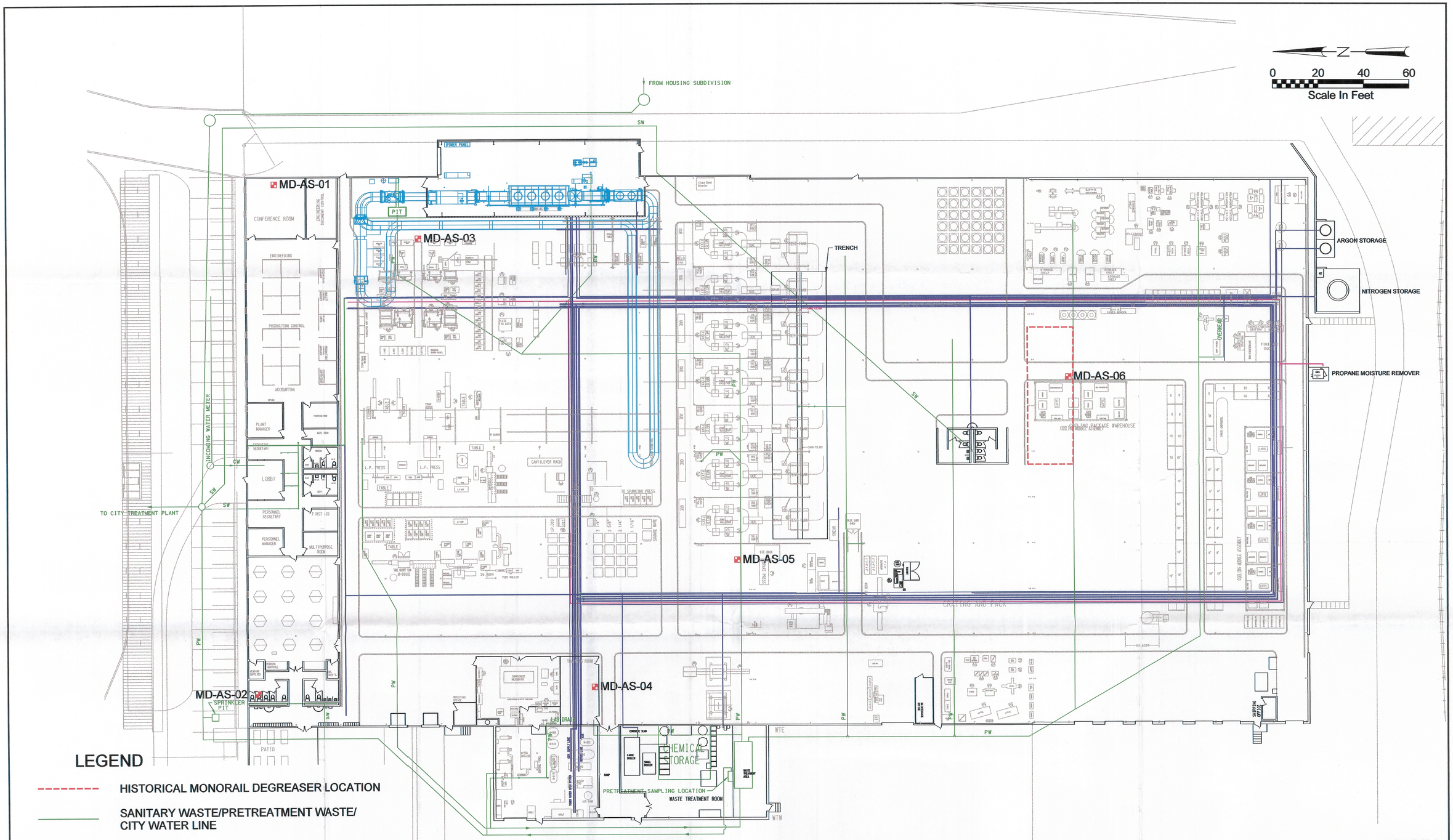


N

NOT TO SCALE

FIGURE 1
SITE LOCATION MAP
MODINE MANUFACTURING COMPANY
CAMDENTON, MISSOURI
JULY, 2002

CH2MHILL



LEGEND

- HISTORICAL MONORAIL DEGREASER LOCATION
- SANITARY WASTE/PRETREATMENT WASTE/ CITY WATER LINE
- OVEN
- PROCESS PIPING
- PROPANE PIPING
- MD-AS-02 AIR SAMPLING CANISTER LOCATION

2992fig01.dlv

FIGURE 2
INDOOR AIR SAMPLING LOCATIONS
MODINE MANUFACTURING COMPANY
CAMDENTON, MISSOURI
DECEMBER 2002

CH2MHILL